Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Numbering Policies for Modern Communications	)	WC Docket No. 13-97
	)	
	)	WC Docket No. 04-36
IP-Enabled Services	)	
	)	WC Docket No. 07-243
Telephone Number Requirements for IP-Enabled	)	
	)	
Services Providers	)	CC Docket No. 95-116
	)	
Telephone Number Portability	)	CC Docket No. 01-92
	)	
Developing a Unified Intercarrier Compensation Regime	)	WC Docket No. 10-90
	)	
Connect America Fund	)	CC Docket No. 99-200
	)	
Numbering Resource Optimization	)	
	)	
Petition of Vonage Holdings Corp. for Limited Waiver of Section 52.15(g)(2)(i) of the Commission's Rules Regarding Access to Numbering Resources	)	
	)	
	)	GN Docket No. 13-5
Technology Transitions Policy Task Force Seeks Comment on Potential Trials	)	

COMMENTS OF NEUSTAR, INC.
WC Docket Nos. 13-97, 04-36, 07-243, 10-90, CC Docket Nos. 95-116, 01-92, 99-200

REPLY COMMENTS OF NEUSTAR, INC.
GN Docket No. 13-5

SUMMARY

The telephone number ("TN") is undergoing its third evolution. When it first came into existence, the ten-digit TN served primarily as a network address for the routing of telephone calls. With the advent of local number portability following the enactment of the Telecommunications Act of 1996, TNs evolved to become more about personal identification and less about network routing as consumers could take their TNs from service provider to service provider, though still tied somewhat to geography. TNs are now on the precipice of their next evolution, one that may free them from the bounds of geography as the industry transitions from traditional time-division multiplexing ("TDM") telecommunications networks to all-IP networks.

Neustar believes that the paramount priorities for the numbering policies and processes that will accompany this transition should be to maximize participation and adoption by service providers, to achieve the highest operational efficiencies, and to minimize the risk of disruption to essential ongoing operations. In doing so, consumers will reap the benefits of the new services that an IP-based infrastructure can enable, supported by a reliable and effective telephone numbering system well into the future. In pursuing these goals, the FCC, state regulatory commissions, and the industry should build upon the foundation of the existing numbering architecture and governance.

Neustar believes that, over time, the geographical constraints on TN allocation and assignment should be eliminated so that TNs can be distributed more efficiently. This examination of numbering also will give the FCC, the states, and the industry the opportunity to explore other options for more efficient assignment and allocation of TNs. For example, the concept of Individual Telephone Number Pooling, which would allow service providers the option of requesting numbers on an as needed basis, instead of in thousands-blocks, deserves

examination. Neustar is willing to assist with a trial of this approach to TN assignment and allocation. Also, given the move toward IP networks and away from the geographic nature of TNs, the Commission should consider introducing non-geographic area codes that can be used for all telecommunications services.

With respect to numbering databases, Neustar believes that over time the complex processes for maintaining and synchronizing the nation's various numbering registries could be simplified and consolidated, eliminating the need for service providers to interface with multiple organizations and systems.

In addition, as the industry progresses further toward IP networks, it will need a routing database that can handle both TDM calls and IP calls. With the dual capability of being able to route TNs on TDM networks and on IP networks, the NPAC is ideally and uniquely suited to assist the industry through the transition from all-TDM networks to blended TDM/IP networks to all-IP networks. Since the introduction of IP routing attributes in the NPAC in 2009, several providers have begun to explore use of the NPAC as an addressing registry to support VoIP routing. Neustar is assisting with that activity, and is willing to work with the industry on similar efforts.

Neustar, with nearly two decades of telecommunications numbering expertise, stands ready to support the FCC, the states, the industry and consumers through the transition to all-IP networks.

TABLE OF CONTENTS

Neustar, Inc. ("Neustar"), the nation's North American Numbering Plan Administrator ("NANPA"), Thousands-Block Number Pooling Administrator ("Pooling Administrator"), Pseudo-Automatic Number Identification ("p-ANI") Administrator, and Local Number Portability Administrator ("LNPA"), respectfully submits these comments in the above-captioned proceedings.

I. INTRODUCTION

Telephone numbers ("TNs") in the United States are on the brink of their third major evolution in over a century. When it was first designed, the ten-digit North American TN (NPA-NXX-XXXX) acted primarily as a network address—geographically segregated, directly translatable to network routing instructions by virtue of the dialed digits. Numbers were allocated to service providers in blocks of 10,000 for a small geographic area—regardless of the need—because originating networks were programmed to interpret the first six digits of a number (NPA-NXX) to identify the terminating switch and service provider. A device's TN was directly linked to the service provider and switch location to which a call would be delivered.

Following the Telecommunications Act of 1996 ("Telecommunications Act")[1] and the introduction of local number portability ("LNP"), this direct link between the NPA-NXX and the terminating switch was broken, moving the industry into the second phase of TNs. This severing of the direct link between the TN and the terminating switch was made possible due to the implementation of Location Routing Number ("LRN") technology. LRN technology changed the way networks operated in the United States and the manner in which virtually all calls are completed. An LRN can be used by networks to route calls to a different switch than that identified by the NPA-NXX of the dialed number. This was a fundamental change in call routing, necessitating upgrades to switches, TN inventory platforms, billing systems, and service

[1] Telecommunications Act of 1996, Pub. LA. No. 104-104, 110 Stat. 56 (1996).

provider interoperability requirements. It also altered the way TNs were administered, assigned and routed in North America.

LRN required the deployment of a nationwide system that could maintain the information necessary to associate TNs dialed by consumers with LRNs used by networks for routing calls. This system, called the Number Portability Administration Center[2] ("NPAC"), is a critical element of the United States' communications infrastructure and provides the American consumer with the ability to retain a TN while changing service providers, an important economic benefit.

The NPAC is integrated directly (or in some cases indirectly) into every communications provider's network and operations support system. Today, it contains over 620 million TNs and connects to more than 4,700 users that represent over 2,500 service providers. Every day the NPAC distributes to its users' networks over 1.2 million updates to TN routing and addressing information. This distribution happens in real time; the average time it takes for the NPAC to process a change and broadcast it to the entire communications industry is seven seconds. Virtually all communications services in the United States, including traditional voice, mobile, Voice over Internet Protocol ("VoIP") and text, rely on the availability, accuracy, and performance of the NPAC.

The Telecommunications Act brought a large number of new entrants and technologies, and consequently led to acceleration in demand for TNs from the North American Numbering Plan ("NANP"). Because numbers were allocated to each new service provider in large increments (*i.e.*, 10,000), the threat of number exhaust became significant. To address that potential crisis, national Thousands-Block Number Pooling was introduced in 2002, vastly

[2] What is commonly referred to as the NPAC consists of seven regional NPACs that geographically correspond with the former Bell Operating Company regions.

improving the efficiency of TN assignment and extending the life of the NANP by decades. Thousands-Block Number Pooling is accomplished through the NPAC's ability to provide all networks in real time with updated network and routing information associated with the allocation and assignment of numbering resources. Today, the NANP is more resilient than ever and consumers receive the benefits of choice, competition, and unencumbered access to TNs.

Soon, however, the industry's methods and practices regarding TN administration and routing will require another evolution—one driven by another round of market and technological change in the communications industry. Increasing demand for mobility, personalization, and rich communications experiences have led service providers to begin the process of evolving away from the current time-division multiplexing ("TDM") Public Switched Telephone Network ("PSTN") infrastructure, and toward an all Internet Protocol ("IP") infrastructure.

For fixed-line carriers, the deployment of broadband technologies has paved the way for IP-based communications services to be delivered directly to consumers and businesses. For wireless carriers, the industry's adoption of LTE and Voice-over-LTE establishes IP as the basis for core network management and transport, resulting in the convergence of multiple cellular protocols into a single IP-based standard. Moreover, the widespread deployment of Wi-Fi networks has extended IP-based communications to a variety of enabled devices and applications. These islands of IP networks require interconnection for seamless end-to-end communications.

The implementation and industry adoption of an all IP infrastructure is a multi-year effort, requiring the collaboration of service providers, technology vendors, state regulators, consumers and the Federal Communications Commission ("FCC" or "Commission"). Neustar is pleased that the process is already underway, signaled by discussions at the FCC's Technological Advisory Council ("TAC"), the North American Numbering Council ("NANC"), the Industry

Numbering Committee ("INC"), the Future of Numbering Working Group ("FoN"), and the Local Number Portability Administration Working Group ("LNPA"). All of these efforts suggest important changes are possible in the future to the way TNs are administered, assigned to service providers, and used to authenticate devices and users on the network.

In light of the potential benefits to consumers from IP technology, the FCC is encouraging deployment of IP networks under the premise that certain core characteristics of the PSTN be retained. Specifically, the Commission is engaged in a broad-ranging effort to modernize its numbering rules in light of the significant ongoing technology transitions in the delivery of voice services.

Significantly, on April 19, 2013, the Commission adopted a Notice of Proposed Rulemaking ("NPRM") and an Order addressing direct access to TNs for VoIP providers, and also adopted a Notice of Inquiry ("NOI") seeking comment on a broad range of numbering issues, with a particular focus on whether TNs should remain tied to geography, including the impact of moving away from geographic TNs on numbering administration.[3] The NPRM and NOI were followed on May 10, 2013, by a Public Notice issued by the FCC's Technology Transitions Policy Task Force ("Task Force") seeking comment on, among other items, a potential additional trial on numbering issues and related databases, outside of its recently

[3] *See Numbering Policies for Modern Communications; IP-Enabled Services; Telephone Number Requirements for IP-Enabled Services Providers; Telephone Number Portability; Developing a Unified Intercarrier Compensation Regime; Connect America Fund; Numbering Resource Optimization; Petition of Vonage Holdings Corp. for Limited Waiver of Section 52.15(g)(2)(i) of the Commission's Rules Regarding Access to Numbering Resources; Petition of TeleCommunication Systems, Inc. and HBF Group, Inc. for Waiver of Part 52 of the Commission's Rules*, WC Docket Nos. 13-97, 04-36, 07-243, 10-90, CC Docket Nos. 95-116, 01-92, 99-200, Notice of Proposed Rulemaking, Order, and Notice of Inquiry, 28 FCC Rcd 5842 (2013) (*Numbering for Modern Communications*).

authorized six-month trial of direct access to numbers for Vonage and several other VoIP providers.[4]

Neustar believes that the paramount priorities for the numbering policies and processes that will accompany this transition should be to maximize participation and adoption by service providers, to achieve the highest operational efficiencies, and to minimize the risk of disruption to essential ongoing operations. In doing so, consumers will reap the benefits of the new services that an IP-based infrastructure can enable, supported by a reliable and effective telephone numbering system well into the future. In pursuing these goals, the FCC, state regulatory commissions, and the industry should build upon the foundation of the existing numbering architecture and governance.

II. GEOGRAPHIC NUMBERS

A. Geography and Telephone Numbers

The significance of the traditional association of TNs with geography can be divided into five categories:

- Consumer identity – The area code[5] and Central Office code ("CO Code")[6] indicates a connection to a specific geographic area for the consumer (*e.g.*, 212 for consumers living in Manhattan or 202 for those living in Washington, DC).

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[4] *Technology Transitions Policy Task Force Seeks Comment on Potential Trials*, GN Docket No. 13-5, Public Notice (May 10, 2013) (*Task Force PN*). According to the Task Force, this additional trial would specifically examine changes in the structure of the current numbering databases, including the assignment of numbers and the features, capabilities, and security of numbering-related databases. *Id.* It is also seeking comments on related issues such as the use of numbering databases for things other than voice and the interplay between numbering and CNAM. *Id.*

[5] An area code is the first three digits of a TN. Area codes are assigned to a specific geographic area within a State known as a Numbering Plan Area ("NPA"). At an earlier time, there was a one to one relationship between an area code and an NPA, leading the terms to be used interchangeably. That one to one relationship, however, ceased with the advent of area

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- Routing and interconnection – Calls are routed to points of interconnection ("POI") of Local Exchange Carriers ("LECs") that are physically within the Local Access and Transport Area ("LATA")[7] associated with the CO code.

- Number administration, including utilization and exhaust forecast – Area codes are assigned to specific NPAs within states, CO codes and thousands-blocks[8] are assigned to service providers and to a specific rate center. [9]

- Billing – Service providers using distance sensitive rates bill calls based on the distance between the rate centers associated with the originating and terminating CO codes.

- Public safety – Calls from a wireline phone to 9-1-1 rely on a database that maps originating TN to a location in order to route the call to the correct Public Safety Answering Point ("PSAP").

B. Telephone Numbers in the Future

1. Impact of the Transition to IP

The migration to IP networks opens opportunities for a more consolidated and efficient framework for administering and allocating TNs and for connecting networks with consumers. In the *Numbering for Modern Communications* NOI, the FCC seeks comment on the

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code overlays, in which one or more additional area codes may be assigned to the same NPA. As a result, there are currently 298 area codes in the United States assigned to 243 NPAs.

[6] A CO code is the first six digits of a TN. CO codes are assigned to a specific service provider's switch within a specific rate center and within a specific LATA.

[7] LATAs are regions created during the divestiture of AT&T that defined the areas within which the Bell Operating Companies ("BOCs") were permitted to provide local exchange service and exchange access service prior to satisfying the requirements of Sec. 271 of the Telecommunications Act of 1996. There are 193 LATAs in the United States.

[8] A thousands-block is the first seven digits of a TN. The thousands-block consists of all thousand numbers in the range. For example 571-434-0 includes all numbers between 571-434-0000 and 571-434-0999. Thousands-blocks are assigned to service providers within a rate center as inventory to allocate to their consumers.

[9] A rate center is a smaller area within an area code that can be thought to designate a city, or portion thereof, or town or collection of towns. The billing of distance sensitive rates is estimated using the distance between rate centers. There are currently 18,535 rate centers in the United States.

recommendations made by the FCC's TAC that the Commission consider "[f]ully decoupl[ing] geography from number" (*i.e.*, the implications of separating TNs from their addressing and billing functionality).[10]

Neustar believes that over time the geographical constraints on TN allocation and assignment (*e.g.*, rate centers, LATAs, lack of non-geographic numbers) should be eliminated.[11] These constraints cause inefficiencies with regard to number utilization and IP network architecture. Many consumers believe it is no longer necessary to have a TN associated with the place they live or work, which is the result of the movement from wireline service to mobile and VoIP by consumers—a shift that is occurring as the industry evolves the PSTN from TDM to IP infrastructure.

Linking TNs to geography also may no longer be necessary for billing purposes. Billing is now predominantly based on usage and has moved away from the traditional model that combined usage with the distance between the calling and called party. Moreover, as terminating access charges are phased out, distance will be irrelevant when it comes to intercarrier compensation.

Allocating numbering resources to geography and rate centers also has proven to be an inefficient use of a scarce resource and could accelerate TN exhaust with the introduction of new

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[10] *Numbering for Modern Communications* at para. 118 (citing Technological Advisory Council, Presentation to the Federal Communications Commission at 60 (2012), *available at* http://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting121012/TAC12-10-12FinalPresentation.pdf.

[11] The regional structure of the NPAC may place an artificial constraint on the geographic portability of a TN. A TN can only be ported between two service providers that are users of the same regional NPAC.

services enabled by IP.[12] In order to conserve consumer resources for the long term, and to pave the way for removing geographic constraints for TNs completely, the FCC, with the collaboration of service providers, should reconsider assigning blocks of TNs to specific rate centers and consider assigning them on a broader geographic basis instead.[13]

2. Individual Telephone Number Pooling

The industry, in collaboration with state regulators and the FCC, also has the opportunity to begin the process of developing the means to allocate TNs to carriers in direct proportion to their need. Under this approach, TNs can be assigned to and returned by service providers as needed, based purely on the demand driven by consumers, enterprises, and connected devices on the network. Individual Telephone Number ("ITN") Pooling, as proposed, for example, by AT&T in its comments in response to the *Task Force PN*,[14] allows service providers the option of requesting numbers on an as-needed basis, from a common pool stewarded by a neutral, non-service provider third party, such as the Pooling Administrator. The process would require national standards, which could be developed by the appropriate industry numbering committees

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[12] As discussed above, the NANP was threatened with exhaust due to the practice of allocating entire CO codes (*i.e.*, 10,000 numbers) to each service provider within a rate center. Thousands-block Number Pooling and other conservation measures have improved efficiency, but thousands-blocks are still allocated to each service provider within any rate center that they plan to do business. The utilization rate of allocated TNs is still approximately 50%. That is, about 50% of TNs allocated to service providers are allocated to consumers. Area codes can and do exhaust while 50% or more of the TNs are still unassigned.

[13] If the allocation of Central Office codes and thousands-blocks were decoupled from rate centers, numbering resources would be allocated in a more efficient manner. Service providers would ask for numbering resources within a specific area code and, as long as they met number utilization and interconnection requirements, would be assigned a thousands-block. Utilization reports would now be done on an area code basis rather than by rate center, and number administration would stop assigning resources to rate centers. Service providers would need to evaluate the impact on legacy operations support systems and they would have to work with States to evaluate the impact on tariffs.

[14] *See AT&T Task Force PN Comments* at 38.

with guidance from the FCC. It likely would extend the life of the NANP and provide maximum accommodation for growth in TN demand.

3. Non-geographic Area Codes for All Services

Today, non-geographic numbers are reserved for special services such as toll-free. Given the opportunity offered by IP service and the movement away from the geographic nature of TNs, the Commission should consider making non-geographic area codes eligible to support other communications services. Doing so would allow for area codes that cover the entire country and are not linked to a specific state or geography. As IP networks become more pervasive, non-geographic numbers may be attractive to consumers of these other communications services and could be allocated in a more efficient manner than geographic numbers. Expanding the scope of services eligible for non-geographic area codes could move demand away from geographic area codes, thereby extending their lives.

III. ROUTING AND INTERCONNECTION

A. Databases

Over time the complex processes for maintaining and synchronizing the nation's various numbering registries (*e.g.*, BIRRDS/LERG, NPAC, NANPA, Pooling Administrator, and SMS/800) could be simplified and consolidated along common functions and platforms, eliminating the need for users to interface with multiple organizations and systems, thereby greatly reducing service provider overhead in the administration of numbers. In a recent presentation to the NANC, the FCC's Chief Technology Officer, Dr. Henning Schulzrinne, raised for consideration the advantage of consolidating numbering databases over time as

networks move further into the IP-world.[15] Neustar believes that the eventual consolidation of numbering databases is in the best interest of service providers and their consumers and should be pursued based upon the foundation of the industry's existing numbering architecture and governance.

Centralized databases are key enablers of transformation and innovation. As the industry moves towards IP and away from a rigid geographic structure, a centralized database to provision and distribute critical information to a broad community provides a natural bridge between both current practice and new requirements. The NPAC already supports connection to all service providers in the United States over standard and secure interfaces, in an environment of high performance and neutrality. As a result of industry governance combined with regulatory oversight, the NPAC's real-time, high availability architecture has been extended to support consistent enhancements to portability (*e.g.*, intermodal, VoIP, one-day porting), national pooling, the needs of law enforcement and public safety, and, most recently, the introduction of IP technology to the communications landscape.

Significantly, and contrary to statements made in the *Numbering for Modern Communications* NPRM and NOI,[16] the NPAC already has the capability to associate IP routing information, including Session Initiation Protocol ("SIP") endpoints, to TNs. In 2008, the NANC's LNPA Working Group approved the addition to the NPAC of a Voice Uniform Resource Identifier ("URI") field that could be used for the routing of IP calls, and in 2009, after the North American Portability Management LLC amended the NPAC contracts, the field was

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[15] *Technology Transition: Numbering*, Henning Schulzrinne, NANC February 21, 2013 Meeting, *available at* http://www.nanc-chair.org/docs/documents.html.

[16] *Numbering for Modern Communications NOI* at paras. 53, 131. ("Some parties note that carriers have historically relied on the LERG and LNP DBs to route calls, but these DBs cannot identify SIP endpoints.")

added to the NPAC.[17] With the dual capability of being able to route TNs using LRNs on TDM networks and using URIs on IP networks, the NPAC is ideally and uniquely suited to assist the industry through the transition from all-TDM networks to blended TDM/IP networks to all-IP networks.

Indeed, there is a growing recognition that the NPAC can play an essential role in the numbering transition. As noted by AT&T:

> The development of [an] ENUM-database is a critical predicate to the ability of the industry to scale IP interconnection. And the industry, including AT&T, is fully involved in working cooperatively to resolve the myriad issues associated with establishing that database. An expanding number of providers, including ILECs, CLECs, cable companies, and wireless providers, are working on proposals for using the NPAC (*i.e.*, the local number portability database of record) and NPAC administrator to provide this function, and have begun discussions to initiate a trial later this year. [18]

In the past, multiple segments of the industry have attempted to establish ancillary databases to support IP interconnection. These approaches, however, failed to achieve widespread adoption, in part because the databases employed lacked significant attributes already possessed by the NPAC, including nationwide access to all carriers, existing interfaces with carriers' networks and operational support systems, neutral administration, and governance that ensures representation of all industry segments.

Similar limitations arise when considering how to evolve other existing industry registries, including the LERG Routing Guide ("LERG"). This platform does not integrate to

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[17] Fields to support SMS and MMS URIs were incorporated into the NPAC at the same time.

[18] *AT&T Task Force PN Comments* at 25. The term ENUM describes a set of standards developed by the Internet Engineering Task Force ("IETF") to enable the mapping of TNs to Internet addresses. *See also T-Mobile Task Force PN Comments* at note 12. ("In addition, the local number portability database is administered based on seven U.S. regions, and the database is capable of handling IP addressing.")

service provider networks in real time relying instead on coordinated, scheduled releases of effective-dated updates. While the LERG will continue to have a role as long as SS7 infrastructure is in use, over time, as the networks evolve away from SS7 to all-IP, its principal functions can be performed by an IP facilities and numbering registry.

It would also be possible in the future to distribute numbering assignment updates from the NANPA and Pooling Administrator in a far more efficient manner than is currently performed, over the same real time NPAC API that is already directly integrated into the service providers' networks and systems.[19]

With regard to LIDB/CNAM,[20] there are multiple methods for providing CNAM service to service providers. These options allow both the originating and terminating service providers to offer the best service to their customers. Current industry models are not geographically specific and operate regardless of the geographical registration of a number. These approaches also allow for the development of Caller ID related services and extensions including such innovations as Caller ID on the television screen and the use of Caller ID to manage privacy among many other applications. These flexible industry models provide a basis for service providers to adopt the one that best fits their customers and service requirements.

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[19] Neustar recently expressed support for the recommendation of the NANC's Numbering Oversight Working Group's recommendation that the functions of the NANPA and Pooling Administrator be consolidated to promote industry efficiency and suggested that the Commission should consider including Business Integrated Routing & Rating Database System ("BIRRDS"), LERG, and the system for the assignment of Common Language Location Information Codes ("CLLI Codes") as part of that consolidation. See *Reply Comments of Neustar*, submitted June 3, 2013, *Comment Sought on North American Numbering Council Recommendation That the FCC Consolidate its North American Numbering Plan Administrator and Pooling Administrator Contracts, Public Notice,* WC Docket No. 92-237; WC Docket No. 99-200 (April 22, 2013).

[20] LIDB stands for Line Information Database used by telephone companies to provide CNAM, or Caller ID Name, to call recipients.

B. Routing to Points of Interconnection

In the TDM network, the NPA-NXX of the TN identifies the Point of Interconnection ("POI") of the terminating network. These POIs are both a physical interface, *i.e.*, a wired connection between two service providers, as well as an application interface, *i.e.*, voice. TDM POIs are physically located within the geography defined by the NPA-NXX. For example, in a TDM network, a 212-234 POI would physically be in Manhattan.

It is very different in an IP environment. In IP networks, the physical and application interfaces can, and often are, in two different physical locations. The physical interface will often be at an Internet Exchange Point ("IXP"), a physical location where Internet service providers ("ISPs") connect and exchange traffic. The application interface (*i.e.*, SIP), though, is often at a Session Border Controller ("SBC") within the data center of the terminating service provider. Neither of these interfaces needs to have any relationship to the geography of the TN, thus there is no need for the geography of the TN to place restrictions on how service providers design their networks or determine their IP POIs.

The first phase of the evolution to IP will be an environment where there are both a TDM POI and an IP POI for the same TN. TDM networks will route to the TDM POI and IP networks will route to the IP POI. The final phase will be all-IP routing.

To facilitate this transition the industry should consider the possibility of an IP network indicator for TDM networks. Calls to and from TDM networks can identify a terminating POI by using the CO code of the TN or LRN. Calls from IP networks to IP networks can use a SIP URI obtained from information downloaded from the NPAC Voice URI field. There is currently no way, however, to indicate to an originating TDM network (or switch) that the terminating network has both a TDM POI and an IP POI. Having such an indicator could provide more

efficient call processing for networks that have both TDM and IP infrastructure, *i.e.*, the TDM switch that can route the call to an IP network. The industry could also use dedicated IP LRNs for this purpose, from either existing geographic area codes or perhaps future non-geographic area codes. The table below describes the resources used for routing to POIs based on the capabilities of the originating and terminating networks.

Call processing (Orig ntwk->Term ntwk)	**POI identifier**
TDM->TDM	CO code (of TN or LRN)
IP->TDM	CO code (of TN or LRN)
IP->IP	SIP URI (from NPAC Voice URI field)
TDM->IP	?

C. Spoofing

With the proliferation of IP technology, it is becoming easier for entities to take part in nefarious activities and impersonate any TN as the calling TN. Spoofing is already a rising concern for service providers with regard to TNs. For example, it is becoming more common to spoof the originating TN for caller ID—in particular to deliver spam text messages and telemarketer calls. This problem is of great concern when one considers how TNs are used for two-factor authentication by web-based service provider, and given the reliance on TNs by the E9-1-1 public safety system.

TNs, unlike many other identifiers used over the Internet, are ubiquitous, globally unique, assigned as a public resource with neutrality in mind, and above all highly trusted. Current and future numbering policies should include measures to ensure that TNs retain their status as secure and reliable identifiers. The industry has begun to address this problem at the IETF

Secure Telephone Identity Revisited Working Group ("STIR"). Neustar stands ready to assist the FCC, states and service providers in combating this activity.

IV. ADDITIONAL TRIALS ON NUMBERING ISSUES AND RELATED DATABASES

In the May 10, 2013 Public Notice, the Task Force seeks comment on potential additional trials on numbering issues and related databases.[21] The *Task Force PN* notes the Commission's recent authorization of a limited 6-month trial to provide interconnected VoIP providers direct access to numbers, and now seeks to examine more specifically changes in the structure of current numbering databases. In particular, the Commission asks about potential trials around individual telephone number pooling (as opposed to today's practice of thousands-block pooling), and the processes of number administration and portability in an all-IP environment. Since the existing databases administered by Neustar on behalf of the Commission and the industry play an integral role in these issues, Neustar would be pleased to volunteer resources from the NANPA, Pooling Administrator and the NPAC as necessary to facilitate any trial that the Commission and the industry choose to undertake.

A. Individual Telephone Numbers

As discussed above, there appears to be interest in exploring the process of assigning blocks of numbers less than one thousand, which has the potential to reduce significantly the frequency of area code exhaust by maximizing the utilization of existing resources. In AT&T's comments in response the *Task Force PN*, it suggests a trial utilizing the NANPA, Pooling

[21] *See Task Force PN*.

Administrator and NPAC.[22] Neustar would be pleased to support such an approach and is willing to work with the Commission and the industry to undertake such a trial.

B. VoIP Routing

The *Task Force PN* asks "what protocols and procedures are most effective to assign and port numbers in an all-IP environment?"[23] Current industry governance and registry tools remain the best way to support porting and assignment as the industry evolves to all-IP networks. The current procedures and policies surrounding number portability have been refined to support evolving technologies since LNP's inception 16 years ago, *e.g.* the addition of wireless LNP in 2003, VoIP portability in 2007, IP fields in the NPAC in 2009 and one-day porting in 2010. These mechanisms are well suited to continue the transition to all-IP networks.

A necessary part of that transition, and of VoIP interconnection generally, will be a database that allows a dialed TN to be routed to an IP end-point. As noted by the Alliance for Telecommunications Industry Solutions ("ATIS"), representing the INC, in its *Task Force PN* comments, "some existing TDM networks and functions will continue to operate until the migration to IP is complete. Thus, any new databases or modifications to existing databases should accommodate the need for a dual mode (TDM and IP) telephone routing environment until such time that every TN can route successfully in an all-IP environment."[24] As discussed above, the NPAC is uniquely suited to handle this need. From its inception, it has had the ability to translate a TN into a LRN used to route in a TDM environment. With the addition of the Voice URI field in 2009, it now has the capability to translate a TN into a URI that is used for routing in an IP environment.

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22 *See AT&T Task Force PN Comments* at 38.

23 *Task Force PN* at 10.

24 *ATIS Task Force PN Comments* at 10.

As discussed above, several providers are already exploring the use the NPAC to support IP interconnection and routing.[25] To the extent service providers are interested, Neustar is willing to offer the NPAC to facilitate other efforts to use it for the routing necessary for VoIP interconnection. Beyond the TDM and IP routing capabilities discussed above, the NPAC offers quick time-to-market, existing interfaces to participants, and a robust existing platform that is network agnostic, offers real-time data distribution, and neutrality in administration. The NPAC registry can support the assignment and portability of any service attached to NANP resources, including voice, data, messaging, and real-time video.

VoIP routing using the NPAC is not dependent on resolution of other issues involving VoIP interconnection and can be conducted separately from any broader VoIP interconnection trial. However, any VoIP interconnection trial that the Commission explores should include the use of a common registry such as the NPAC.

[25] *See AT&T Task Force PN Comments* at 25, discussed *supra* at 11.

V. CONCLUSION

Neustar, as the NANPA, Pooling Administrator, p-ANI Administrator, and LNPA, has been at the forefront of implementing telecommunications numbering policies for almost twenty years. Neustar agrees that geography is becoming less relevant in telecommunications numbering and that some service providers are considering reducing the number of points of interconnection as a result. Neustar is willing to lend its database resources and expertise to any trials that the Commission and the industry believe will be worth exploring.

Respectfully submitted,

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